



CLAIMS (IN PLAIN TEXT FORM)

(Currently Amended) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization; and

determining one or more magnetic characteristics by measuring and characterizing a magnetic signal of said target-probe complex induced by said applied magnetic field in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and (3c) coercive force as well as (4) magnitude so as to, by action of the determining, identify some one or more of the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

2. (Original) The method of claim 1, wherein said target molecule or molecular complex is disposed on a support.

3. (Currently Amended) The method of claim 2, wherein said target molecule or molecular complex is disposed on the support in an array.

4. (Currently Amended) The method of claim 3, wherein said array is an addressable array.

5. (Original) The method of claim 1, wherein said probe is disposed on a support.

6. (Currently Amended) The method of claim 5, wherein said probe

is disposed on the support in an array.

7. (Original) The method of claim 6, wherein said array is an addressable array.

8. (Currently Amended) The method of claim 1, wherein said determining comprises:

measuring and characterizing the magnitude of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

9. (Currently Amended) The method of claim 1, wherein said determining comprises:

providing a magnetic sensor; and
generating a signal with the magnetic sensor in response to said one or more magnetic characteristics.

10. (Currently Amended) The method of claim 9, wherein said generating a signal with the magnetic sensor uses a giant magnetoresistive ratio sensor.

11. (Currently Amended) The method of claim 9, wherein said determining comprises:

providing a signal processing means that generates readable output from said signal.

12. (Currently Amended) The method of claim 9

wherein said target molecule or molecular complex is disposed on a support;

and wherein said determining comprises:

moving the support or the sensor one in relation to the other in one or more directions.

13. (Currently Amended) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a

plurality of applied magnetic fields having different intensities.

14. (Currently Amended) The method of claim 1, further comprising:

subjecting said target-probe complex to one or more of a plurality of applied magnetic fields having different directions.

15. (Currently Amended) The method of claim 1, further comprising:

contacting the target molecule of molecular complex with a non-magnetic colloid.

16. (Currently Amended) The method of claim 1, further comprising:

joining the probe to one or more colored beads, fluorescent beads, or fluorescent cells.

17. The method of claim 1, further comprising the step of detecting the presence of said target probe complex by visual, electronic or optical means.

103. (New) The method of claim 1, wherein said determining comprises:

measuring and characterizing a time response, called the magnetic swing time, of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

104. (New) The method of claim 1, wherein said determining comprises:

measuring and characterizing a spatial orientation of the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

105. (new) The method of claim 1, wherein said determining comprises:

measuring and characterizing the hysteresis loop exhibited by the magnetic signal resulting from magnetization induced in said target-probe complex in response to said applied magnetic field.

106. (New) The method of claim 105 wherein measuring and characterizing of the hysteresis loop solves the saturation of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

107. (New) The method of claim 105 wherein measuring and characterizing of the hysteresis loop solves the saturation magnetization of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

108. ((New) The method of claim 105 wherein measuring and characterizing of the hysteresis loop solves the remnant magnetization of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex,

109. (New) The method of claim 105 wherein measuring and characterizing of the hysteresis loop solves the coercive force of the target-probe complex, and thus said one or more of the presence, location, orientation and quantity of the target-probe complex.

110. (New) The method of claim 1, further comprising:
subjecting said target-probe complex to one or more of a plurality of applied electric fields having different intensities.

111. (New) The method of claim 1, further comprising:
subjecting said target-probe complex to one or more of a plurality of applied electric fields having different directions.

112. (New) The method of claim 1 wherein the contacting of said

target is with one or more probes containing a ferromagnetic material as the magnetic label.

113. (New) The method of claim 1 wherein the contacting of said target is with one or more probes containing a ferrimagnetic material as the magnetic label.

114. (New) The method of claim 1 wherein the contacting of said target is with one or more probes containing a paramagnetic material as the magnetic label.

115. (New) The method of claim 1 wherein the contacting of said target is with one or more probes containing a superparamagnetic material as the magnetic label.

116. (New) A method of assaying molecules in a sample comprising the steps of:

providing a sample that contains one or more target molecules or molecular complexes;

contacting said target with one or more probes under conditions which permit the formation of a target-probe complex, wherein the probe comprises one or more magnetic labels;

subjecting said target-probe complex to an applied magnetic field so as to induce magnetization; and

determining one or more magnetic characteristics by measuring and characterizing a magnetic signal of said target-probe complex induced by said applied magnetic field in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and (3c) coercive force; and (4) magnitude so as to, by action of the determining, identify the presence, location, orientation and quantity of the target-probe complex, and thus also of the one or more target molecules or molecular complexes.

117. (New) A method of assaying molecules in a sample comprising

the steps of:

providing a sample that contains a plurality of different target molecules or molecular complexes;

contacting said plurality of different target molecules or molecular complexes with a plurality of probes under conditions which permit the formation of a corresponding plurality of different target-probe complexes, wherein each probe comprises one or more magnetic labels different at least in part from magnetic labels of all other probes;

subjecting all target-probe complexes to a common applied magnetic field so as to induce magnetization concurrently in at least two of the plurality of target-probe complexes;

deriving a signal induced by said magnetic field in the at least two of said different target-probe complexes, collectively and in combination; and

analyzing the derived magnetic signal in any one or more of (1) time response, called magnetic swing time, (2) spatial orientation, and (3) hysteresis loop as is solvable for (3a) saturation magnetization, (3b) remnant magnetization and (3c) coercive force; and (4) magnitude so as to identify and characterize each and all of the at least two different target-probe complexes, thus also identifying and characterizing the different ones of the target molecules or molecular complexes that are within these at least two different target-probe complexes;

wherein at least two different molecules or molecular complexes are identifiable, and characterizable, at the same time, and by being subjected to the same magnetic field.